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deferentia opening into a distinct urethra. Ureters discharge directly into the bladder the renal secretion, which thence passes into the urethra. Mammary glands with well developed nipples. Young born when of very small size and imperfect development; never connected by a placenta with the mother, but attached by her to the nipple when born, from which the milk is forced by herself into the mouth of the young. Scrotum in front of penis.

XIII. ORDER MARSUPIALIA.

Only order of the sub-class. Contains thirteen families, referable to four sub-orders: RHIZOPHAGA, with one family; SYNDACTYL, with seven families, two of which are extinct; SARCOPHAGA, with two families; and CHIROPODA with one family; also two extinct families of doubtful affinities.

SUB-CLASS ORNITHODELPHIA.

Brain with the cerebral hemispheres chiefly connected by a well developed anterior commissure, the corpus callosum being very rudimentary, and with no defined psalterial fibres; with the septum very much reduced in size. (Flower.) Sternum with a peculiar T-shaped bone (the episternum or interclavicle) in advance of the manubrium or presternum. Coracoid extending from the clavicle to the sternum, and only towards maturity ankylosed with the scapula. The oviducts, enlarged below into uterine pouches, but opening separately from one another, as in oviparous vertebrates, debouch, not into a distinct vagina, but into a cloacal chamber, common to the urinary and genital products, and to the fæces. Testes abdominal in position throughout life, and the vasa deferentia open into the cloaca, and not into a distinct urethral passage. Ureters pour the renal secretion, not into the bladder, which is connected with the upper extremity of the cloaca, but into the latter cavity itself. Mammary glands with no distinct nipples. (Huxley.)

XIV. ORDER MONOTREMATA.

Only order of the sub-class. Contains two families.

ON THE RELATIONS OF ANOMIA.—BY PROF. EDWARD S. MORSE.

THIS peculiar genus of Lamellibranch mollusks included also *Terebratula* according to the early writers on the subject. Misled by external characters, Linnæus, Lamarck and others believed these two forms closely related. While not the slightest ground existed for bringing them together, yet the mere fact of these two animals being enclosed within a limy shell composed of two pieces, held to the rock by a process which passed out through that element of the shell which was below, was sufficient proof of their kinship, at least to those who were ready to judge everything

by external characters. The whales among fishes, the barnacles among mollusks, were only some of the many blunders made by this superficial way of comparison. And now after the structure of Brachiopods is well known, and all admit the valves to be dorsal and ventral, while the valves of *Anomia* are right and left, and after the splendid memoirs of Lacaze-Duthiers on the anatomy of *Anomia* has shown that the nearest relations are with the oyster and pecten, there are still several zoologists who vaguely imagine that some sort of relationship exists between *Terebratula* and *Anomia*. This brief communication is made to settle the question with those who never care to go more than shell deep in the subject, for unfortunately the author had only the empty shells to work upon. It will also verify the statement made by Forbes and Hanley in their standard work on the British Mollusca, where the shelly plug which escapes from the sinus in the flat valve to hold the body to its base of attachment is compared to a byssus. They say "When the very young fry of this genus shall have been carefully observed, we believe they will be found spinning a byssus, which passing through this sinus fixes the shell in the first instance, before a portion of it becomes attached, eventually becomes detached with a part of the adductor muscle and forms the opercular process." Lacaze-Duthiers in his examination of the adult form refers to these statements and expresses his belief in their correctness.

In examining some sea-weed collected by a friend last spring I found a lot of the young of *Anomia*. In these the sinus was not closed, but open toward the anterior margin. The nucleus presented an elongate oval shell larger behind; the beaks nearer the anterior, and no sign of a perforation. The shape was more like that of *Montacuta*, and the lines of growth were regular and distinct. On the right valve at its lower margin was seen a slight notch, and the few last incremental lines indicated that the notch was made in the last stages of the nucleus. It can only be conceived that the animal before this was a rover, that it then commenced to fix a byssus, the animal dropping to one side and the notch caused by the lowermost valve growing around it, the other valve showing no signs of this notch. So soon however as the shell rested upon one side a different growth took place, a loose-textured, colorless deposit rapidly formed, the outline becoming gradually circular and the lowermost or right valve growing rapidly

behind and downward, then forward and upward, the byssal attachment soon became enclosed in a wide foramen, this extension ultimately reaching the umbones of the larval shell to which it unites. From these facts it will be seen that it presents not even the remotest resemblance to the Brachiopods, but that the young shell has all the proportions of a Bimyarian, and its affinities may be quite remote from *Ostrea* or *Pecten*. A study of the early stages of these last named genera would easily settle all these points.

ON EOZOON CANADENSE IN THE CRYSTALLINE LIMESTONES OF MASSACHUSETTS. BY L. S. BURBANK.

THE limestone deposits here referred to, occur in the band of granitic gneiss which extends in a southwesterly direction from near the mouth of the Merrimack river through the entire breadth of the State, and includes the well known mineral localities of Bolton, Boxboro' and Chelmsford.

Soon after the discovery of *Eozoon Canadense* by Mr. Bicknell, in the serpentine limestone of Newbury, it was also identified by Dr. Dawson in specimens collected by me at Chelmsford; as noticed by Dr. Hunt in the "American Journal of Science" for January, 1870. The specimens then examined were not from the rock in place, but were obtained from some outlying masses near one of the quarries. These discoveries led me to make a further examination of several of the old limestone quarries in the same formation. The eozoonal rock was then found in place at several of the quarries, and its position in relation to the other rocks observed.

At all the quarries the limestone has been so thoroughly exhausted, that the limits of its extent at the surface can be readily traced. The relations of the limestone to the enclosing rocks can thus be easily seen.

By the careful study of these relations, and by reference to many specimens collected and facts observed, the following conclusions have been reached.

1. *These limestones are not true stratified rocks laid down with the gneiss, but are subsequent deposits of a vein-like character.* The fact that some of the deposits appear to be interstratified with the gneiss, and also are found along a line apparently coinciding with the strike of the strata, may seem to indicate that